

Notice of Allowability

Application No.

10/614,393

Examiner

Timothy D Collins

Applicant(s)

HARTMANN ET AL.

Art Unit

3643

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed 3/17/05.
2. ☒ The allowed claim(s) is/are 1-7,9,10,29-33,35 and 36.
3. ☒ The drawings filed on 7/3/03 and in the enclosed ex. amend. are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date 20050517
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☒ Other See Continuation Sheet.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mary Jo Bertani on 5/12/05.

The application has been amended as follows:

AMENDMENTS TO THE SPECIFICATION

The specification has been amended as follows:

Insert paragraph [0023.1] after paragraph [0023]:

[0023.1] FIG. 9E shows a diagram of pressure coefficients above and below an embodiment of a wing that can be utilized in the aircraft of FIG. 2A.

Amend the following paragraphs:

[0024] FIG. 9F shows lift curves superimposed on an equivalent area distribution for the aircraft of FIG. 9A with and without trailing edge lift.

[0025] FIG. 9G shows pressure distribution for the aircraft of FIG. 9A with and without trailing edge lift.

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[0049] Regarding the third non-planar technique, **FIGS. 9B, 9C, and 9D** illustrate the effects of reducing aft shock spike **903** at the trailing edge (TE) of aircraft **200**, as shown in the near field pressure distribution of **FIG. 9C** and the resulting far field pressure distribution shown in **FIG. 9D**. Aft shock spike **903** is generated by a shock wave that occurs off the trailing edge of wing **904**. It is desirable to carry lower pressure above wing **904** relative to below wing **904** to the trailing edge of wing **904**, as shown for example in **FIG. 9E**, to generate an expansion E_2 that reduces or even prevents aft shock coalescence behind the trailing edge of wing **904**. The far field shock disturbances for aircraft **200** can be reduced, for example, from a range of -1.3 to 0.1 to a range of -0.7 to -0.2 as shown in **FIG. 9D**.

[0050] In one embodiment of aircraft **200** that implements the third non-planar technique, wing **904** of aircraft **200** extends near the trailing edge of aircraft **200**. To prevent aft shock coalescence, **FIG. 9F 9E** shows equivalent area distributions for aircraft **200** for the pressure distributions in **FIGS. 9C and 9D** with and without trailing edge lift. Note the substantial reduction of aft shock **903** in the pressure distribution with trailing edge lift. The camber of wing **904** is designed to carry enough lift near the aft end of the vehicle to generate an equivalent area due to lift with a positive slope at the trailing edge of wing **904** as shown in **FIG. 9F 9E** to generate expansion E_2 (**FIG. 9B**) off the trailing edge of wing **904**. Expansion E_2 creates the expansion spike needed for George-Seebass minimization from the difference in air pressure between the upper and lower side of wing **904**. Moving the center of lift aft also maximizes the effective aircraft length that can be used for area/lift tailoring, which also provides the benefit of reducing the strength of sonic boom shocks.

[0052] **FIG. 9G 9F** shows the lift per foot in pounds versus axial location on aircraft **200** designed with and without lift carried at the trailing edge of wing **904**. When lift is carried to the trailing edge of wing **904**, lift per foot rises to a certain level and remains substantially lifting to the trailing edge of wing **904**. In contrast, a typical lift per foot rises to a peak and then reduces to zero upon reaching the trailing edge of a wing, thereby generating a positive pressure spike that results in the aforementioned greater aft shock strength at the ground of -1.3 to 0.1 psf.

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method~~An aircraft capable of supersonic flight,~~
comprising:
 a fuselage;
 a wing; and
 an engine nacelle, wherein the fuselage and wing are configured
 configuring an aircraft for supersonic flight with a tailored area/lift distribution including
 a relaxed bluntness nose and a wing configuration that ~~reduce sonic boom~~
 ~~disturbance, and the wing is configured to carry~~ carries lifting force to the trailing
 edge of the wing to create an expansion at the trailing edge of the wing that
 reduces aft sonic boom ground shock ~~strength~~ loudness by at least approximately
 15 decibels compared to aircraft that do not include the relaxed bluntness nose
 and do not carry lifting force to the trailing edge of the wing.
2. (Currently amended) The method ~~aircraft~~ of claim 1, further comprising
 configuring a shock cancellation shroud around the an engine nacelle.
3. (Currently amended) The method ~~aircraft~~ of claim 2, wherein the relaxed
 bluntness ~~blunt~~ nose further comprises an inlet and a slot, wherein the slot is configured to
 provide an outlet for airflow through the inlet.
4. (Currently amended) The method ~~aircraft~~ of claim 1 ~~2~~ further comprising ~~an~~
 configuring a fixed upward reflex on a portion of the upper and lower surfaces of the wing.
5. (Currently amended) The method ~~aircraft~~ of claim 4 ~~further comprising an~~
 ~~engine inlet at the front of the engine nacelle,~~ wherein an engine the inlet is in positioned aft of
 the upwardly reflexed portion of the wing.

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6. (Currently amended) The method ~~aircraft~~ of claim 1 wherein the combination of said fuselage and wing portion comprises comprise a flying wing.

7. (Currently amended) The method ~~aircraft~~ of claim 2 4 wherein the shock cancellation shroud extends around a portion of the length of the engine nacelle.

8. (Canceled)

9. (Currently amended) The method ~~aircraft~~ of claim 5 wherein a the shock cancellation shroud is positioned behind the engine inlet.

10. (Currently amended) The method ~~aircraft~~ of claim 1 9, wherein the volume of the mid-fuselage portion is reduced above the wing to generate an airflow expansion on a sloped portion of the mid-fuselage to lower the pressure above the wing in the area covered by the expansion, thereby reducing the angle-of-attack required to generate the same lift and reducing pressure below the wing.

Claims 11-28 are Canceled.

29. (Currently amended) The method ~~aircraft~~ of claim 1 further comprising mounting an ~~wherein the engine nacelle is mounted below the wing.~~

30. (Currently amended) The method ~~aircraft~~ of claim 1 wherein the wing is a gull dihedral wing that includes an outboard wing portion without dihedral.

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31. (Currently amended) The method aircraft of claim 1 wherein the wing is a gull dihedral wing that includes an anhedral outboard wing portion.

32. (Currently amended) The method aircraft of claim 1, further comprising:
configuring a high-mounted lifting aft tail ~~configured~~ to carry lifting force to the trailing edge of the aircraft to create an expansion at the trailing edge of the tail that reduces the aft sonic boom ground shock strength.

33. (Currently amended) The method of claim 1 ~~An aircraft capable of supersonic flight, comprising:~~

~~a fuselage; and~~

~~a wing;~~

~~wherein the fuselage and wing are configured with a tailored area/lift distribution~~

~~including a relaxed bluntness nose and a wing configuration that reduce sonic~~

~~boom disturbance, wherein the height of lifting surfaces of the wing is increased~~

~~toward the aft end of the aircraft to increase the effective length available for~~

~~sonic boom minimization.~~

34. (Canceled)

35. (Currently amended) The method of claim 1 ~~The aircraft of claim 33,~~ wherein the relaxed bluntness blunt nose further comprises an inlet and a slot, wherein the slot is configured to provide an outlet for airflow through the inlet.

36. (Currently amended) The method of claim 1 ~~The aircraft of claim 33~~ further comprising configuring an upward reflex on a portion of the upper and lower surfaces of the wing.

Claims 37-45 are Cancelled.

2. The following changes to the drawings have been approved by the examiner and agreed upon by applicant:

New Drawings pages 12/13 and 13/13 take the place of the originally filed drawings.

The New Drawings pages are included at the end of this Examiner's Amendment. **These new drawings sheets have been entered** in this examiner's amendment.

3. The following is an examiner's statement of reasons for allowance: The prior art of record all failed to show either alone and/or in combination a method of configuring a supersonic aircraft with the tailored area/lift distribution with a relaxed bluntness nose and wing with lift carried to the trailing such that an expansion is created and the ground shock loudness is reduced by at least approximately 15 decibels as compared to aircraft without such features.

a. The following art is merely cited as an example of lift distributions.

i. USPN 4072282.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

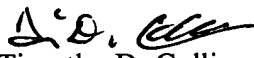
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy D Collins whose telephone number is 571-272-6886.

The examiner can normally be reached on M-F, 7:00-3:00, with every other Fri. off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter M Poon can be reached on 571-272-6891. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Timothy D. Collins
Patent Examiner
Art Unit 3643


Peter M. Poon
Supervisory Patent Examiner
Technology Center 3600

5/31/05

FIG. 9C

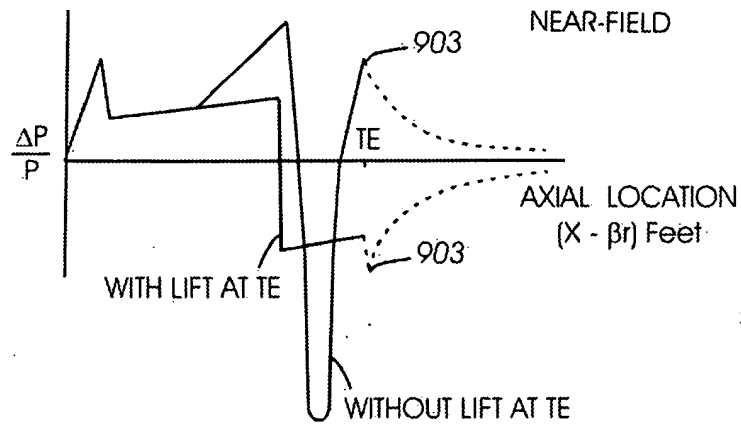


FIG. 9D

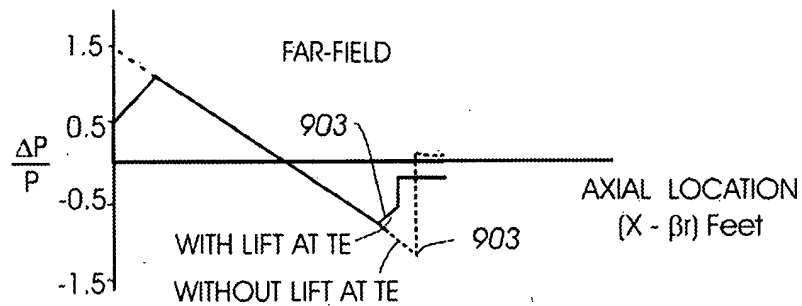


FIG. 9E

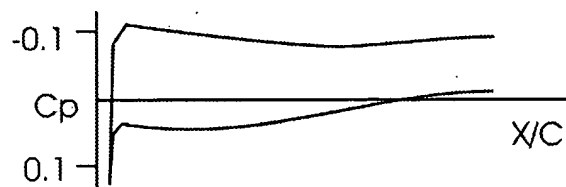
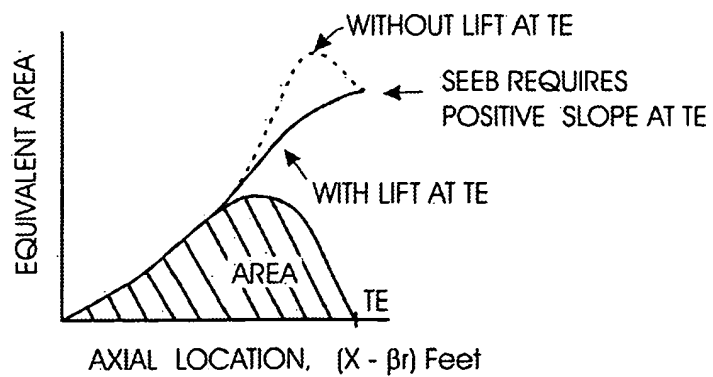


FIG. 9F



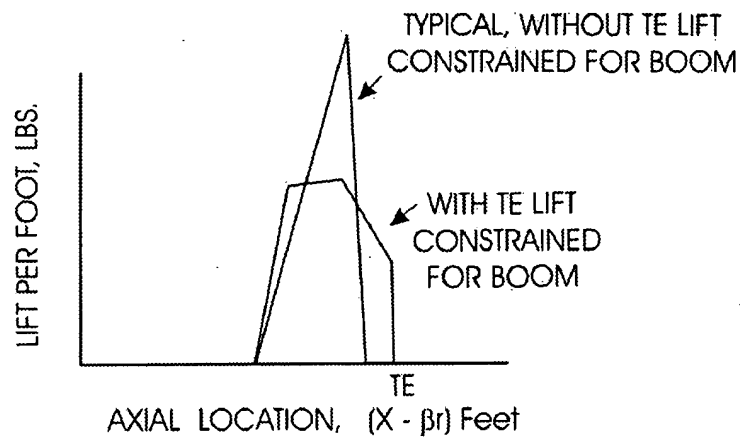


FIG. 9G

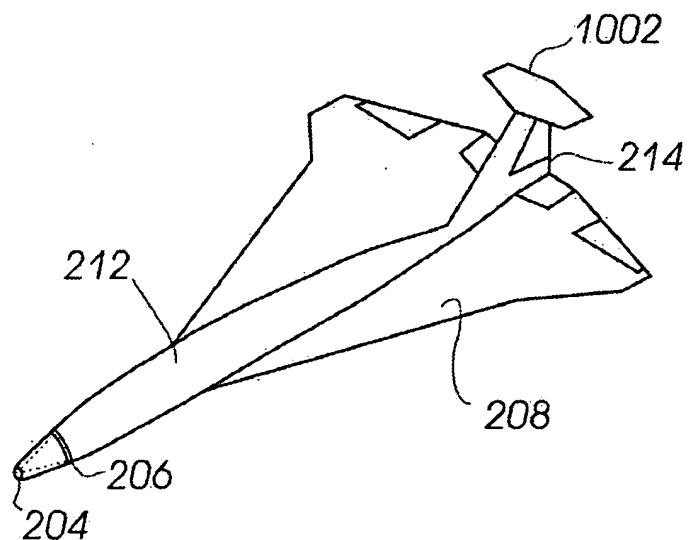


FIG. 10